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This paper describes an educational program for 28 adolescent delinquents at a training school for boys. All of the students had histories of educational failure. Individualized programed instruction and a system of extrinsic learning reinforcements were the experimental basis of the program. Points, exchangeable for money, were given to the students as a reward for learning success. In an environment simulating the nonprison world, the students used the earned money to pay for their room, food, clothing, gifts, and entrance and tuition fees. Students without sufficient funds went on "relief." No student was on relief for more than two weeks. In addition to monetary reinforcement, group reinforcement was given by announcing successes to the entire student body. Test results indicate an average increase for every 90 hours of academic work of 1.89 grade levels on the Stanford Achievement Test and 2.7 grade levels on the Gates Reading Survey. Intelligence test data indicate that the students in general had also increased their IQ rating. (JL)

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M.O.D.E.L.

"Motivationally Oriented Designs for an Ecology of Learning"

a paper presented at the
American Educational Research Association
Symposium on Application of Reinforcement
Principles to Education

February 17, 1967

New York, N.Y.

by

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N. Azrin, T. Ayllon, R. B. Fuller,
I. Goldiamond, B. F. Skinner

This paper also has selections from 2 other papers given by the author during the past 9 months:

1. Educational Therapy, a paper presented for the Third Conference on Research in Psychotherapy sponsored by the American Psychological Association, Chicago, June, 1966

2. Learning Stimulation, a paper presented at the Brooklyn Museum Conference, "The Role of the Arts in Meeting the Social and Educational Needs of the Disadvantaged", November 15-19, 1966

The CASE Project procedures are based upon direct experiences with two educational projects I designed and administered at Southern Illinois University. One, a one-year program for low achievers, the Experimental Freshman Year, and the other a programmed course produced with my associate, James Filipczak. This course--now going through its 3rd year--was an automatic pre-sequenced 3-screen contingency oriented course for 260 college sophomores.

PREFACE

All situations are potentially educational. The means of distinguishing between an environment that increases or maintains educational behaviors and that which does not is by functionally analyzing the behavior of the individual organism which is interacting with his environment. If there is one word that is essential to the description of the learning process, it is the word "behavior".

In the process of evolution, the organism that continues to behave and survives due to his ability to differentiate his behaviors by environmental feedback (survival cues), is the organism that learns and therefore grows. A child starts learning from the moment it is born. Its early learning environments are extremely well-controlled, protected, and ordered by the parent. Without such an ordered and controlled environment, the child would die. Health experiences, in terms of the fulfillment of man's biological necessities, physical growth, and intellectual growth are programmed by the adult world through the adults' accumulation of their own successful experiences. The child's contact with his world expands with the extension of his own developing senses. His first tactile picture of the world is further expanded by his sense of sound and smell which carry him beyond his own physical limitations--namely, the extension of his hand and the position of his mouth. His sense of hearing introduces additional stimuli which further cue him into his survival program; for example, the approaching steps of the mother and the voice of the mother act as a distant introduction to his eating and cuddling schedule. With the later development of his sense of sight, which extends his former world view to the expansiveness of the infinite use of his interpolating brain, he increases not only the range of his cues, but his differentiating experiences. In order to "learn" he must put out some response effort to this expanding series of cues. Because there are consequences both gratifying and aversive to his behavior (his response to cues), he starts to be selective. He varies the strengths of his own responses, the schedule of his response (the time and place). He learns to discriminate--he does not respond to all cues alike. In short, he starts to differentiate out his responses and develops an expanding behavioral repertoire.

The people participating in this conference are involved in the business of positively expanding children's repertoires, the task of educating human beings, the design of educational environments.

The general purpose of this paper is to further your awareness of the effect of a motivationally oriented environmental design upon learning behavior--the effect of a schedule of reinforcement. The particular purpose of this paper is to describe, by research experience, the use of behavioral control in the education of delinquent youth.

The action of environmental stimuli upon individual behavior and the reaction to these stimuli (the student's response) produces a change in the individual. This change is called <u>learning</u>.

Introduction

Some weeks ago Representative Scheuer, Democrat fron New York, proposed the development of a National Institute for Crime Prevention and Control with a research arm comparable to that of the National Institutes of Health. I quote, "We must assure witnesses full protection and educate people to report crimes immediately. The Institute also would promote greater use of technological capabilities in crime detection, than are now being used...." Also he advocates the use of "knock-out pellets in police guns which would immobilize escaping criminals without lethal effect." To support that argument he pointed out that crime in the U.S. costs over $27. billion a year. "A man is shot to death every 30 minutes; there's a rape every 26 minutes; a robbery every 5 minutes; an aggravated assault every 3 minutes; a car theft every minute; a burglary every 28 seconds; a larceny every 12 seconds." I therefore dedicate my talk to a variation of an old adage--that an ounce of successful education is worth a pound of knock-out pellets.

In the past 2 years my associates and I have been involved in the development of a special education project for some of these human statistics Rep. Scheuer mentioned now incarcerated in Federal prisons. In our most recent project which started February 1966, called CASE II-MODEL (Contingencies Applicable to Special Education - Motivationally Oriented Designs for an Ecology of Learning) at the National Training School for Boys, Washington, D.C., we have 28 young juvenile offenders from east of the Mississippi River. We have one homicide, 3 rapists, 2 armed robbers and the rest are an assortment of general housebreakers and automobile thieves. The project has maintained a racial and state regional balance, and the ages range from 14 to 18. One glaring piece of data which encompasses the entire group, no matter whether they be White or Black, from the hills of West Virginia, the streets of New York, the suburbs of New Orleans, or the farms of Tennessee, is that they are all <u>school failures</u>. Eighty-five percent of these youths were dropouts from school. Of the 15% that were still in school when sentenced, their range in levels of retardation, according to SAT (Stanford Achievement Test) scores, was from 3 years to 6 years.

Although averages and medians give little information which is useful for operational research, they act as a focusing device for talks such as this one. For that purpose I should like to give you a description of our subjects: the average age at entry to our project was 16.7 years; the average length of sentence is 2.52 years; the average grade level completed prior to entry was 7.84; the average IQ, Revised Beta, at entry was 93.8; the median SAT score at entry was 6.3; the highest was 9.9; the lowest was 1.3; the average Gates Reading Survey score at entry was 6.45. In the group the oldest student at date of entry was 18.1; the youngest was 14.6. The highest IQ was 112; the lowest was 76. The shortest sentence was 6 months; the longest was 5 years. Only 3 students were never sentenced and institutionalized before--all others had a history of institutionalization in state mental and penal institutions. Two were classified as suicidal. The most frequent offender had been in 5 different penal institutions since he was 10 years old.

These students at the NTSB have had a history of educational failure, and the normative goals and reinforcements that appear to keep the bulk of the American middle class in public school, have not held for them. The NTSB had a typical public school approach to education. It selected those students whom it felt were capable of making it, and put them through the standard classroom activity using the standard goals. The bulk of the inmates did not get to

school. Of the group that got to the school, approximately one-half were considered to be gaining benefit from school work, and of that group a small proportion were prepared to pass the GED (General Educational Development) test requirement.

Although the existing system of education at NTSB was to select only those that looked potentially promising and give them the standard public school approach, we in the CASE Project took them at all levels, even those who did not wish to go to school. We accepted every breathing inmate as sound student material, and we started our educational research project with all 28.

The goals of the CASE II-MODEL Project are to increase the academic behaviors of all of its students, no matter at what level they were, and prepare as many students as possible within our one-year time schedule for their return to the public school system from which they dropped. To fulfill this objective we undertook the following: we converted an old facility (an existing cottage on the prison grounds) into a 24-hour learning environment. We created a point economy using money as the generalized reinforcer. We established schedules of reinforcement and hired the students to work for us. Each student became a Student Educational Researcher and went to work on approximately 140 programmed educational courses, and 18 programmed classes. They were working for the corporation--and their product was intellectual wealth in general, and academic work in particular. When they performed on tests at 90% or better, they got paid off. We planned a new curriculum with 80% of all our subject matter taught by individual programmed instruction or programmed texts; the other 20% by programmed classes.

A system of time clocks located throughout the building established our basic measurement tool. We set up new evaluation methods for parole based upon objective academic measurement and recordable social behaviors.

We created a society full of choices and perquisites normally not available in a prison, but available to the average wage earning American. The students pay for their room, their food, their clothing, their gifts; and they pay an entrance fee and tuition for special classes. A student who does not have sufficient funds goes on relief--sleeps on an open bunk and eats food on a metal tray. No student has ever been on relief more than 2 weeks.

The Ecology of Education

All growing organisms must be supported. There are ecological requirements for growth whether they are the biological or physical phenomena. In order to grow, a plant is sustained by solar energy, rain and earth's chemistry, as well as the other flora and fauna which may not add only to its growth, but, in certain cases, also provide for its death. The American automobile is a complex phenomenon. It could not exist without a reciprocal complex phenomenon called American industry. Automobiles cannot function adequately unless we build roads for them to move upon. Nor can they function very long without a supply of oil, gasoline and tires, some of which are produced from as far as 5,000 miles away. Any building (any manmade or natural environment) is chained with umbilical cords to a sub-organism, street, then on to a next order, city,

to a next order which is the surrounding state. Without this network of pipelines, these umbilical cords which are under the surface of the earth, industrial man could not continue to operate. In the same manner, learning behaviors are not isolated, but are dependent upon a reinforcing environment to sustain them.

Learning can be described simply as an additive phenomenon. For example, a child of three confronted for the first time with the written numerations such as 2 + 2 with an = sign will ignore it. Simply, he would not respond appropriately by writing or indicating 4. Through an educational procedure, a child may come to respond with another bit of marking when confronted with the same question at a later time. If he then puts the number 4 which previously (before we had educated him) he could not respond to, we call this learning to add. There is, however, another thing about learning, and that is that it requires not only an environment that produces the learning behaviors, but one that maintains the newly acquired material. Each one of us has taken a course in which we were required to learn subject matter, for example to "learn calculus". If we have not used calculus, as I have not for at least 18 years, we find that we are unable to pass a simple calculus exam without much review and much study. The question may be asked, "If learning is additive and we have put something into the so-called hopper, why is it not possible to conjure it up?"

The young men that we are dealing with at the NTSB have all gone to school at some time. Although most of them are dropouts, some of them still can perform some simple academic skills. Some of them, I am sure, even learned to multiply while in a school classroom. They even might have read Shakespeare. Then they went into their home environment to find that the use of Shakespeare had no meaning, no payoff, when used at home or in the pool hall. Generally, if a young man started to quote Shakespeare in an E. St. Louis pool hall, he would not find a very friendly or supporting group. The difference between studying Julius Caesar in East St. Louis and studying Julius Caesar in the Lab School at the University of Chicago is that the community in Chicago would tend to reinforce the children when they discuss such classics, since they consider it a sign of intelligence (a productive use of verbal behavior). In fact, the parents of the University of Chicago high school population consider it essential for the growth of the young adult; whereas, in East St. Louis the question might be asked, "What's Julius Caesar worth? Will this help me get a job? What use does it have with the gang?" The book itself might be economically worth 50¢ on the open market--but unless there is a group of human beings who would consistently reinforce the above-mentioned slum environmental youngster, Julius Caesar dies indeed by many hands other than Brutus'.

Books (regular or programmed) are paper and ink. Films (black and white or color) are cellulose and sound waves, and lectures are "minds pushing out hot sound waves". Books, films and lectures become meaningful only when "there is something in it for the receiver." That "something in it" is the required condition for the first input which is then sustained by a schedule of reinforcement and later maintained by an external reinforcing environment.

Schools--A Program for Failure

When institutions, whether they be an open or closed system, plan to deal with an individual in a therapeutic environment (an environment designed to produce specified terminal objectives) an attempt is made to examine the

students' past behavioral record, and prescribe an interpersonal therapy program based upon his past behavior. In our work we attempt rehabilitation by putting in new academic and socially appropriate behaviors under a schedule of reinforcement while extinguishing antisocial behaviors, the inappropriate ones, by a schedule which is either competitive or non-reinforcing. The importance of putting in a set of specified academic content performance, with a schedule of reinforcement, is that it programs the individual for success. In the CASE II Project, we have adolescents who have had a long history of failure--both at home and in the school environment. The punishing aspects of failure to perform in these environments produce not only "school dropouts", but dropouts from life. The normal educational environment is a rigged slot machine--on a long limited hold and a variable schedule of little success, heavily sprinkled with performance schedules that lead to no payoff--failure. The standard educational environment is aversive and punishing to a student with a limited history of success and a small academic repertoire.

Often, professionals assigned to the role of rehabilitators (therapists) fail to recognize that the public schools control the bulk of the early child's and young adult's academic and social development. The student who arrives in class unprepared is under some "anxiety"--that is, a higher probability for failure. He hopes the teacher will not call on him to recite or to respond to a question. If called upon and he responds inappropriately with the incorrect answer, he places himself in a twofold dilemma. He might be laughed at by his peers, or reprimanded by the teacher. In truth, he may have studied, but was unable to understand the material because it was inappropriate for his level or it was poorly written. Going to class unprepared is for a teenager like going to a swimming party with a square style bathing suit--one which you wouldn't be caught dead in--or coming to the same party where one is appropriately dressed but cannot swim and, consequently, flounders when he is pushed into deep water. Such a party, where one is either dressed inappropriately, or can't respond to the demands of the situation (namely swim and make out) is not <u>gratifying</u>. The classroom environment, in such situations for such individuals, has been ungratifying and, therefore, aversive. Such a student under such a history of performance, begins to drop farther in his seat to avoid direct contact with the situation. Eventually he escapes the aversive environment by removing himself completely from the punishing situation. He drops out of school.

The 85% of the students in our project that had dropped out of school before being sentenced for their crimes had little or no academic success. By pretesting them and assigning them programmed instruction at a level where they could successfully perform, we guaranteed success for each individual, no matter on what level he began. Thus, each individual is on his own track and becomes programmed for success, in contrast to his past educational environment where he was basically programmed for failure. Little by little each student-inmate, through this step-by-step process, found out that he was able to perform 90% or better in his test-work. We do not lower the requirements of the academic work, just as we do not lower the requirements of life. These youngsters recognize the dropping of standards as "mickey mouse", something done for an individual with lower intelligence, for a second class citizen. A student already under racial or regional discrimination is further angered by an attempt at lowering standards.

The Second Class Adolescent

If we examine the behavioral repertoire requirements of the American adolescent we find that America requires a completed high school education as a necessity for industrial success and a college degree for administrative success. The young school dropout delinquent is aware of these requirements, and statements made to him such as, "Well, you can't read very well, so you won't make high school, but why don't you get a job as a plumber's assistant or a laundry presser" only reinforces his initial viewpoint--that he is not very bright and is considered by you to be a second class citizen. If it is "good" and necessary for the free, healthy, non-delinquent adolescent to complete school, read and write and be prepared for a new technological revolution, then it is necessary and "good" for the delinquent and present deviant to have the same goals.

The importance of producing a contingency oriented environment which increases academic skills and maintains these newly acquired behaviors is not just to demonstrate and prove a learning theory and develop an educational technology. These newly acquired educational skills act as a program which reinstates in the young deviant the promise that he can be "normal". "Normal" in this case means that he can be successful in an area where he formerly was unsuccessful and, furthermore, that this success will provide him with the ticket to re-enter the mainstream of the American adolescent world--the public school system and the choices of opportunities that follow.

Values are not changed without a new academic grid. The proof is the university, and self-worth is not available to those individuals who are told at the beginning of their rehabilitation program that they cannot be like the rest, that they cannot learn to make the school system, that they should accept their lot (their stupidity). It might be argued that it is unfair to tell a youngster with an IQ below 90, that he can learn to read and write and do algebra like the rest of the "healthy" socially adjusted adolescent group. After all, the school system has not been able to get these youngsters to succeed, and his past academic performance should be ample evidence of his inability to pass. The questions may also be asked, "Why establish false hope? Isn't this a false contract?"

The completed work in CASE I and the new data available to us in CASE II clearly demonstrate that it is not the youngster who has failed, but it is the public school system and the ecology that maintains that school system that have failed; that it is not the youngster who is mentally bankrupt, but that it is the public school and the systems that sustain it that are bankrupt.

The design and use of new schedules of reinforcement in a contingency oriented environment, the use of programmed instruction and the design of a new curriculum, produce academically competent youngsters who now recognize that they are becoming successful in an area which was for them previously failure. This is no longer a laboratory theory but a proven fact.

Reinforcement Systems: points, people, self-worth, success in front of peers, space and subject matter, etc.

In CASE II-MODEL each individual works on his educational material because there is a payoff. One extrinsic reinforcement set into the system is points; i.e., he is paid off in points when he is right. Each point he receives is equal to 1 penny (in money). Specific environmental cues (facilities and signs) help the student to differentiate out his own behaviors. In CASE I, learning to do math and respond to programmed instruction started first in the classroom area and was extended into the library and the students' private offices. In CASE II, after a history of success in the educational area, the student can take material into his own private bedroom. This private bedroom is designed to sustain the following: it gives him privacy--it also gives him a piece of personal property which permits him to invite friends in. It gives him an area where he can gather and display the results of his educational accomplishments--those things he earns and that which he buys and puts up in his own room. He can pin up on the walls whatever he wants. It is his own room.

We have students that pin up religious icons, cars, maps, pictures of family, etc. Most of the young men pin up icons from Playboy magazine. Some staff believe that the students pin up the nudes so as to help stimulate night-time masturbation. Others feel these pin-ups are to show the other students that they are clean cut he-man types--sexy males. Because of the private sleeping arrangement and the ability of the students to rent a private shower, there have been none of the usual homosexual problems that accompany prison confinement.

In each bedroom area the students have their desk area which at night can be closed up to become part of their locker and storage system. An individual can work in his own room--writing letters, drawing pictures, making models of cars, or doing additional school work. Here we have an environment which has multi-physical stimuli. In that one little room it says, "sleep", "dress", "Man, bring your friends in", "smoke", "hang your coat up", "Let's talk about the outside world", "Let's eat some peanuts", "Let's write a letter to my girlfriend". These are behaviors which are supported by the rules of the establishment and permitted by the physical equipment and space design of the room. In his room the student is permitted to sit up all night and read; both the rules and a private lamp, bed and chair in his room, plus his own ability to read, make that behavior possible.

We have also scheduled special areas for specified behaviors. The student offices, upstairs in the educational environment, are solely used for the support of assigned academic tasks. The question is not whether an individual can take behaviors such as reading and writing, and be able to perform them elsewhere under other environments, for we know this to be true. The reason for the private office is that the space and the other instructional cues are, at the beginning, a critical space reinforcer in the learning chain.

I remember, as a young adult, I did my homework on the kitchen table and very often had to break in the middle of my school work so that the family could have dinner. There are people who do their school work in bathrooms. Once there is established a history of performance of a particular skill in great

strength (for example, a long history of reinforcement for academic behaviors in his office) an individual can carry that behavior to any other environment which can physically sustain it. A learned behavior although shaped up in one particular environment does not remain the "victim" of that original environment so long as the system of reinforcement was generalized. The reason for that is that the environment was not, in the case of reading in the office, the major discriminating stimulus that continued to support the behavior.

Besides the extrinsic payoff in points, reading has built into it a series of reinforcing steps which maintain a student's continuing to read. You read a road sign for information. If you are interested in getting to Williamsburg by car, and if the approaching road sign says "Williamsburg" and then some words underneath, there is a high probability that you will continue reading the whole sign because you are interested in getting to your destination. We all read because there is something in it for us. We read our books in school and took our tests because there was something in it for us. The "something in it for us" might have been a job or $5.00 for each "A". Today, for some college students, the grade of "C" or better is the ticket for staying out of Vietnam. Good grades also permit some young people to hang around college and make out--socialize and join the fraternities. Also, good grades may permit some to get through and get that degree which then permits them to go and join their father's business or IBM's. For some, buying a car or getting married, having children and going off to Europe are good goals. It also might be that some of us read and learn because we "enjoy it", for the sheer pleasure of it--like the scholar and the Jesuit. But America is not filled with scholars and Jesuits. Although the American ideal is that everyone should perform at his best level, and do "good", our Training School students have demonstrated that they have not been maintained by these ideal goals. For these non-Jesuit types we use an extrinsic immediate reinforcer, money, to get the academic behaviors started. Money, rather than their love of parents, God and country, is the major initial reinforcer for our students. Some young men are willing to wait for their delayed reinforcement, but our delinquent student-inmates want to know, "Man, what's the payoff <u>now</u>?" They, like most of us, are willing to work for money.

If we can take as a basic premise that every individual needs to have some payoff, some system of reinforcement, the question we need to ask then is, "When, and on what schedule?" Unlike the Jesuit who will wait until his final hour for his reinforcement, God and Heaven, the student-inmates are not willing to wait for good report cards, diplomas, and the rest of the delayed reinforcements.

Using money as a generalized reinforcer works in our educational research environment, just as it does in our society. But there are areas of activity which provide types of reinforcement which are equally powerful, and in some areas more powerful, than money. To make the point--a young man, playing basketball in front of his high school friends, sets a difficult basket shot, the girl cheerleaders jump up and down, and the crowd cheers. Money cannot buy that kind of reinforcement. That's what the adolescents refer to as "goodness". This kind of goodness comes out of a specific singular performance in an environment where the successful behavior is immediately reinforced by the peer group. Group reinforcement is extremely powerful. Thus, we attempted to program some of these into the system. For example, not only was the student paid off in points, but when he did well on an exam (earned 100%) the staff was instructed to

bring the accomplishment to the attention of all the students and say all kinds of good things like, "Gosh, that was great" or "Man, that's cool". This is recognition for a task performed. However, one must not approve just any task, but only those that require some competent behavior, or a large effort--for the student knows the difference between a task requiring lots of competent behavior to get a job "well done", and that which is a "mickey mouse" task. This group area of reinforcement is one that the normal academic community has failed to use constructively. On the other hand, the athletic coaches have used it successfully and have not only maintained but have generated a tremendous amount of activity. The academic teaching staff still primarily relies on long-range goals for all its students. The athletic coach rewards for any bit of advancement--a pat on the back for a close try is reinforcing, and teaching by successive approximation. Why is the athlete always running around a track, practicing every day and trying to better his score? "What's in it for him?" It's for that one big moment--the big payoff--when he runs in the track meet, he succeeds, and everybody cheers.

In conclusion

A curriculum developed on the basis of programming, by successful steps in academic behaviors using extrinsic reinforcement, can become the useful key--the handle by which any therapist, teacher, psychologist, psychiatrist, etc., can increase a student's academic repertoire and successfully deal with an individual's educational and attitudinal behavior problems. Environments can be designed that sustain learning. Learning, putting in new successful behaviors, is the program for successful educational rehabilitation. The unlearning part, the extinguishing of anti-academic and anti-social behaviors, is done by the individual differentiating his own behaviors by using the newly learned set of values which he now has imprinted by the success he experienced with this educational model. Changing a student's values is the product of a good school environment. The success of any academic program is not merely the specific subject matter coursework that is measured by points or grades and percentages, but the way a student who has matriculated deals with his environment: how he applies this newly found grid--his value system in his own small society, and eventually the world society.

The challenge I see is to teach academic and social prerequisites for the appropriate behaviors and to design and produce environments which support and maintain such learning for the rehabilitation, not only of the deviant--the individual whose present behavior is inappropriate to the cues of the middle class environment--but for the bulk of American youth, the group now in the public school system. This new educational environment is not merely made up of buildings, teachers, and students with books, it is an educational ecology made up of a contingency oriented environment--with schedules of reinforcement, physical spaces, teachers, students, texts and films, programmed or otherwise, groups and individuals--supported by a well designed active behavioral chain. Such a learning industry, whose basic product is a 100% successful growing intellect, is our goal. Hopefully, we are all committed to that goal. However, when we find that we are not producing the "A" product, then we should admit that it is <u>our error</u> and not the child's--that the bankruptcy lies in our system and not in the student's capability.

The data produced thus far in CASE II is very encouraging. The CASE II project average of its students for every 90 hours of academic work:

Stanford Achievement Test	+ 1.89 grade levels
Gates Reading Survey	+ 2.7 grade levels

An example of the CASE II students' range in the SAT test given in December of 1966:

Number of students	Change, in a 3-month period, since last SAT
2	+ .5 grade levels
8	+ .5 to + .9 grade levels
11	+ 1.0 to 1.9 grade levels
3	+ 2.0 to 2.4 grade levels
1	no change
1	- .1 grade level

A Revised Beta IQ was given during December with a resulting increase in the students' IQ rating of an average of 12.09 points. Of this average increase in the Revised Beta, the highest increase was +27 points by one individual student. Two students indicated a minus show of performance, the lowest being a -5.